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ple skin of otter, seal or guanaco, imperfectly serving as a protection from cold. Bracelets, necklaces of shell, etc., are also worn by the women; and the men often wear a band of feathers or down, usually of *Bernicla antarctica.* The only cutting instrument of the Fuegians is a knife of the Mytilus shell fastened to a stone handle with shreds of sealskin. The fishing lines, made of the stems of *Macrocystis pyrifera*, or of whalebone fibers, end in a running knot furnished with a hook made from a feather. Fire is obtained by striking together two pieces of pyrites, and with the spark enkindling a mixture of the down of birds and fine scrapings from Berberis or Drimys. These scrapings are used also as sponges or napkins.

## MICROSCOPY.[1]

SOME HISTOLOGICAL METHODS BY DR. C. S. MINOT [*continued*].—*Dripping apparatus for cutting under alcohol.*—We use the form constructed by Dr. W. W. Gannett, as shown in the sketch. A liter bottle is convenient in size; the height of the stand should be such as to bring the end of the dripping tube about one inch above the blade of the microtome knife, on which the alcohol is allowed to fall continuously. To regulate the flow, an eighth inch globe valve is found to be the most convenient.

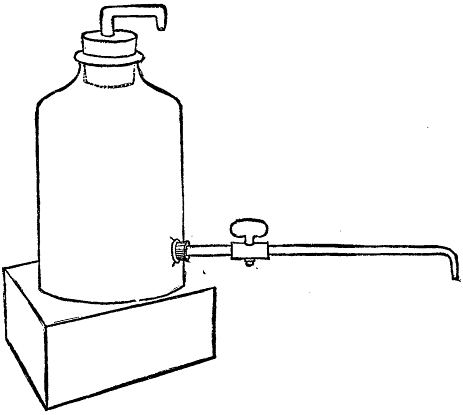

FIG. 1.—Dripping apparatus.

*Benzole.*—I find replaces xylol perfectly and is much cheaper.

*Balsam.*—Use filtered Canada balsam diluted with pure benzole.

*Alcohol.*—I never use absolute alcohol. I have never found any use for which alcohol of ninety-six per cent is not sufficient, and have employed it for many things successfully for which absolute alcohol was stated to be necessary.

*Oil*—for microtome. After many trials of various oils, we have settled on "*pure paraffine oil, specific gravity 25.*"

*Paraffine.*—1. Hard commercial paraffine melting at 55°–56° C.
2. Soft "chewing-gum" paraffine melting at 50°.

Twenty parts of 1 + nine parts of 2 makes a good mixture, melting about 55°, and cutting well at 20°–22° C., the ordinary winter room-temperature.

*Picric Acid Carmine.*—Boil one gramme best powdered carmine with 200 c.c. of water, plus an excess of picric acid, for half an hour. Allow it to stand and cool; decant the clear fluid, add fresh water, and if necessary picric acid; boil, cool and decant; repeat this operation until all the carmine is dissolved. Place the decanted fluid in an evaporating dish, add about one grain thymol and stand in a warm place until the volume is reduced to 25 c.c.; let the solution cool; filter; wash out the residue which should be on the filter with 25 c.c. water; dilute the filtrate solution with 50 c.c. water. By this means a solution ready for use, which will keep indefinitely and contains carmine and picric acid in good proportions, can be prepared with certainty.

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[1] Edited by Dr. C. O. WHITMAN, Mus. Comparative Zoology, Cambridge, Mass.

It gives a stronger differential coloring than Ranvier's picric carmine, but overstaining must be avoided most carefully; for staining sections two to five minutes are sufficient. The fluid stains connective tissues (fibrous) deep red, striped muscle deep dull red, smooth muscle, blood and horny tissues bright yellow, glands reddish-yellow; with the kidney it gives differentiation of the different portions of the tubules; for the central nervous system it seems to be of little value. If rightly used it gives a sharp nuclear coloring.

If the aqueous solution is evaporated to dryness the residue may be redissolved in alcohol, giving an alcoholic carmine dye. This I have not yet tested sufficiently. Apparently the alcoholic solution will not keep but a few months. The alcoholic solubility of the dye offers the advantage that sections stained in the watery solution can be washed in alcohol directly.

A NEW WATER-BATH.—The following is a description of a water-bath planned by Mr. E. A. Andrews and myself, which has been in use for some time in the biological laboratory of the Johns Hopkins University.

The bath proper consists of a closed copper cylinder twenty-eight inches in diameter and eight inches deep. To the borders of holes cut in the top are soldered four round, flat-bottomed basins, eight inches in diameter and four inches deep, with a distance of two inch-

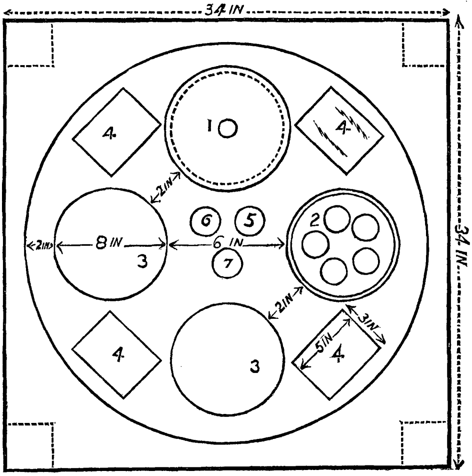

FIG. 1.—Surface view of the bath ni the table. 1, basin with lid on, 2, shelf with holes for dishes in basin; 3, open basins, 4, rectangular basins for slides; 5, tube for gas pipe; 6, hole for regulator; 7, hole for thermometer.

es between the nearest points of any two basins ; and nearer the edge of the top, at the angles between the round basins, are four rectangular basins each five inches long, three and a half inches wide and two inches deep. In each of the large basins is placed, on movable supports, a shelf for the paraffine cups. This shelf is made from the circular piece of copper which was cut out of the top for the insertion of the basin. For each basin there is also a copper lid with a button handle in the center and a hole, a half inch in diameter, near this for a thermometer. When the bath is once regulated this thermometer can of course be dispensed with and the hole in the lid can be plugged up with a cork. By this arrangement the paraffine dishes are always kept dry and at a uniform temperature all over. The four rectangular basins are used for warming the slides. In each of them is a movable rack made of two tin slips, each about a half inch wide and folded as shown in Fig. 3. Each of these basins also has a copper lid with a button handle in the middle.

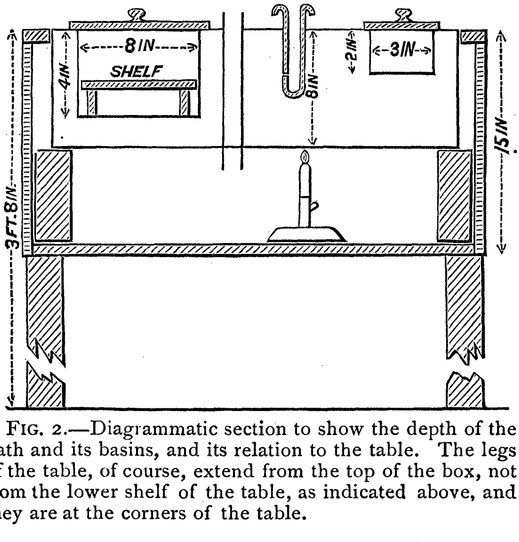

FIG. 2.—Diagrammatic section to show the depth of the bath and its basins, and its relation to the table. The legs of the table, of course, extend from the top of the box, not from the lower shelf of the table, as indicated above, and they are at the corners of the table.

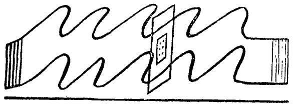

FIG. 3.—Supports for slides in rectangular basins.

Near the center of the bath a tube one inch in diameter passes from the top down to and through the bottom. This tube is the passage way for the glass tube that connects the burner under the bath with the gas jet above the center of the bath, and it should be soldered to the upper side as well as to the under side of the bottom of the bath. Near this tube are two others, each one inch in diameter, that project about one and a half inches above the upper surface of the bath, but are soldered with their lower ends flush with the under side of the top of the bath. One of these tubes is for the automatic regulator, and the other is for the thermometer. Through them the water is put in or taken out of the bath. The thermometer and regulator are each in a test tube with holes blown in the sides, about one and a half inches from the bottom, and with a good flange on the upper edge by which it is supported on the copper tube. A bit of cotton in the bottom of the test tube protects the mercury bulb of the regulator or thermometer from any jars against the hard test tube. The holes in the sides of the test tube allow the water of the bath to come in direct contact with the mercury bulbs and at the same time they are up high enough to keep the mercury from running into the bath should either of the mercury bulbs break while in the tube. The copper bath is supported in a square box-table, the top of the bath being flush with that of the table.

This table essentially is a box on four legs, with a hole in the top slightly more than twenty-eight inches in diameter, and with a door at one end. The bath is supported on four props that rest on the lower shelf of the table, and around the inside of the table is a lining of common tin to protect against possible accident. By this means a steady flame is obtained and the loss of heat is reduced to a minimum. And by grouping the regulator, thermometor and gas pipe near the center of the bath, hindrances are practically done away with. There is also connected with the gas jet a small home-made glass Bunsen burner that is attached to the glass gas tube a little above the bath. It is very convenient for warming dip tubes, lifters, etc. In so large a bath as this two flames are required, but both are burned very low. The one burner is connected directly with the gas jet and the other by way of the regulator. After the bath has, so to speak, been once set it runs on uniformly and requires no attention. It is regulated by putting a thermometer through the hole in one of the lids into the dry chamber and shutting off the regulator burner when the chamber is warm enough. The temperature, as indicated by the thermometer that dips into the water, is always a few degrees higher than that of the dry chambers. When the thermometer in the water indicates a temperature of 60° C. the basins are warm enough to keep the hardest grade of paraffine melted. The whole stands at a convenient working height, about three feet eight inches, and is very satisfactory.—*Henry F. Nachtrieb, Fellow Johns Hopkins University.*

SUGGESTIONS AS TO THE PREPARATION AND USE OF SERIES OF SECTIONS IN ZOOTOMICAL INSTRUCTION.—It is convenient to have in the laboratory prepared series of certain types, so that the student may supplement the information he has acquired from dissection by the study of these. Thus entire series of Limax and Cyclas and partial series of the earthworm and leech are almost indispensible for an accurate knowledge of the anatomy of these forms.

Slides 2′ × 3′ (*i. e.*, double the ordinary width instead of double the ordinary length) are most convenient for small stages, and fit into many forms of slide-cabinets. Mica covers may be cut for these, and have the advantage of cheapness.

Czokor's alum-cochineal (Arch. mik. Anat. XVIII, 412) is an exceedingly convenient stain for such purposes, as it penetrates an object of considerable size readily, and differentiates admirably. Thus a Limax may be left in the fluid twenty-four hours, afterward washed in water and the excess of coloring matter removed by seventy per cent alcohol before it is transferred to stronger alcohol. Sections of tissues stain in the fluid in from two to three minutes to two to three hours, according to the method of hardening that has been adopted.

The fluid is prepared as follows: Rub up seven grammes of cochineal with an equal quantity of burnt alum in a mortar, add 700 c.c. of water, and boil down to 400 c.c. Add a trace of carbolic acid, and filter.

Bismarck brown in concentrated solution in water or seventy per cent alcohol also stains well *in toto;* there is no danger of over-staining, as the excess of color is removed by alcohol. It is particularly to be recommended where cartilaginous parts are to be studied, or where the sections are to be photographed. [The use of plates in which the sensitized surface is impregnated with a weak solution of eosin (Jour. Roy. Mic. Soc., Dec., 1884, p. 969) is said to obviate the necessity of using special stains for photographic purposes.]

Schällibaum's collodion and clove-oil mixture (one volume of the former to three of the latter) is excellent for sticking the sections to the slide. Although it is possible by this method to stain the sections on the slide in either watery or alcoholic media, much time is saved, and on the whole more satisfactory results obtained by staining the objects previously *in toto.* The collodion medium stains slightly in aniline colors, if staining on the slide be resorted to.

The study of a slide containing a large number of sections may, in certain cases, be much facilitated by having a photograph of the slide enlarged two or three times by means of an ordinary view lens. Such an enlargement is frequently sufficient to indicate where an organ appears or disappears in a series, and thus to save time in the study of the individual sections.—*Professor R. Ramsay. Wright, Toronto.*

A CHEAP BELL-GLASS FOR THE LABORATORY TABLE.—Taking a plain glass finger-bowl four or five inches wide and about two inches deep, a handle may be prepared by gluing a three-quarter inch cork to the bottom. Cut off the smaller end of the cork smoothly and cover it with marine glue. If the end of the cork is now heated over a spirit lamp until the glue takes fire, and the cork is quickly pressed with its glue-covered end upon the center of the bottom of the dish, you have a cork handle by which you can lift the dish.—*J. A. Ryder.*

A SIMPLE METHOD OF INJECTING THE ARTERIES AND VEINS IN SMALL ANIMALS.—The principle involved in this method is that by the use of two injecting fluids, of different densities, one passing through the capillaries, the other arrested at the capillaries, the whole vascular system may be injected from the aortic arch.

The application of the principle is as follows: (1) The animal is immersed in tepid water and the heart is uncovered. (2) The apex of the single ventricle, in the case of an amphibian, or of the left ventricle in the case of higher animals is then laid widely open and the blood allowed to flow freely from the auriculo-ventricular aperture (see *p* in the figure). (3) A cannula is then inserted a short distance into the arterial bulb and the first ligature is fastened around the nozzle. The second ligature is then made ready around the base of the ventricle, thus surrounding the auriculo-ventricular apertures. (4) An ordinary gelatine injecting mass, stained deep red or purple, is in the meantime prepared. When the body is thoroughly warmed, this mass is slowly injected. As the second ligature is still loose, a quantity of blood gradually followed by the gelatine issues from the auriculo-ventricular opening. (5) When the gelatine begins to run pretty clear, the second ligature is fastened and the syringe containing gelatine is replaced by another containing a red plaster-of-paris injecting mass. The latter drives the gelatine contained in the arteries before it as far as the capillaries, thus completely filling the venous system. When the gelatine is thoroughly cooled the animal is ready for dissection.

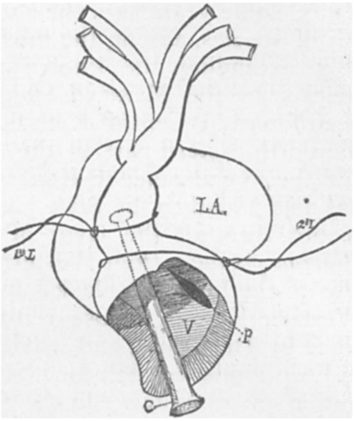

Fig. 1.—Illustrating method of preparing the frog's heart. *V*, ventricle; *LA*, left auricle; *p*, auriculo-ventricular opening; *1st L* and *2d L*, first and second ligatures; *C*, cannula.

This method can be applied with considerable ease to all the smaller animals, such as frogs, lizards and pigeons, in preparation for class-work or investigation. Its advantages are numerous. Among its disadvantages may be mentioned the fact that alcohol cannot well be used as a preservative, because it dehydrates the gelatine, causing it to shrink and break up the veins. This difficulty is entirely obviated, however, by the use of Wickersheimer's fluid, in which the injection remains perfect for an indefinite time.—*Henry F. Osborn.*

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## SCIENTIFIC NEWS.

—The Washburn Biological Survey of Kansas, says the Kansas City *Review*, has for its object "to investigate the fauna